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Subject: MNF Beech Bark Disease 1995 Study Report

To: MNF Supervisor

Clark:
meant to copy this to you earlier. Doesn't appear that you got a copy. DC 6/18/96

Each year, since 1986, select beech trees on the Monongahela National Forest have been examined for beech bark disease (BBD). Three permanent plots, mostly beech component, were chosen within the Greenbrier Ranger District on the Cheat, Burner, and Middle mountains. A total of 397 trees are examined on the permanent plots for beech mortality and disease progression.

Beech bark disease is considered a disease complex which involves a scale, Cryptococcus fagisuga and a fungus, Nectria spp. Movement of the disease through the forest has been characterized by the advancing front and killing front. Characteristic of the advancing front are beech trees which support building populations of the beech scale. The scale is a soft body insect that feeds within the beech phloem. The amount of scale present can be easily rated and is based on the amount of wool-like wax exudate seen on the boles of trees. Transition to the killing front occurs when the fungus begins to colonize the small but numerous wounds made by the feeding scale. The fungus produces small, bright red fruiting bodies. The areas colonized by the fungus expand in size and eventually girdle the trees. Beech trees usually can tolerate large populations of feeding scales, but they usually die as a result of colonization by the fungus.

In 1986, one of the three permanent plots, Cheat Mountain, was located within the killing front. Signs of the fungus were already present here and many trees were dead at this time (Table 1). The Burner Mountain and Middle Mountain plots were within the advancing front but close enough to the killing front so that they could be monitored for fungus infection within a relatively short time period. However, the fungus was not seen when the plots were established and that is the reason for the low mortality.

Table 1 lists the beech mortality as it occurred on the 3 permanent plots in 1986, 1990, and 1995.

Table 1. Percent Beech Mortality on 3 Permanent Plots Within the MNF

	CHEAT MTN	BURNER MTN	MIDDLE MTN
1986	21.02	5.69	5.93
1990	42.31	16.26	12.71
1995	73.00	29.30	41.51 — x = 48

Mortality of mature beech on all three plots increased significantly for each time period (Table 1). In all cases, rapid fungal colonization of beech bark and consequent death of trees followed a progressing insect scale infestation. Scale populations were highest in 1989. But as they decreased, due to the decreasing phloem food source, conditions were set for the Nectria fungus to predominate and begin killing trees.

Further observations will continue to be made at these plots. The data obtained will eventually provide information on how long beech trees survive once infested by the beech scale and the Nectria fungus. Data also will show the effect of beech mortality on other tree species or newly colonizing seedlings on the study plots. One major consequence of beech mortality is beech sprouting that normally occurs following the decline or death of trees. The amount of sprouts and their effects on other colonizing trees will be studied.

Most interesting, we find beech trees that appear resistant to the beech scale. In fact, small groups of beech without any disease symptoms can presently be found on all three study plots. Trees can be scale resistant by having very smooth bark or trees can produce a chemical or a bark response. Understanding the role of resistant trees over time will increase our understanding of stand dynamics. Understanding this will help us to recommend the best sequence and timing of silvicultural practices needed to manage this disease in the future.

If you have questions or would like to discuss this, please contact me at 304-285-1553 or Martin MacKenzie at 304-285-1550.

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Forest Health Protection

cc: AO
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